3. Continuous alfalfa (strip-cut), planted 1974.
4. Wheat, planted December 1974, followed by soybeans planted in June 1975.
5. Safflower, planted December 1974, followed by grain sorghum planted July 1975.

The wheat-soybeans, safflower-grain sorghum, and rotation cotton will be staggered from year to year in a rotation system so that each unit of the rotation will be compared with continuous cotton and continuous alfalfa. Yields and other pertinent production information has been taken and recorded in an effort to determine the efficiency of land use and crop production, economics of the production practices as a result of the insect management system, and the effectiveness of the cropping sequences in the rotation.

Intensive sampling was done on all the crops in the rotation sequence during the past year in an effort to determine population densities and movement of any given species. This data is still in the process of being analyzed and it is hoped that from this information a threshold base can be established for each pest, predator, and parasite that can be utilized in future comparisons.

Additional research in this area includes the evaluation of a continuous cotton and early-maturing barley double cropping system as an aid to insect management and efficient crop production. An early-maturing barley, Arizona 1970-1, was planted on two different dates in Nov. 1975 and will be followed by a planting of Deltapine 61 cotton in April 1976. Determinations of the effects on insects and pests will be established with major emphasis on the pink bollworm.

BIOLOGY AND CONTROL OF INSECTS AFFECTING COTTON IN ARIZONA

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Objective: To determine the effectiveness of various insecticides against certain cotton pests.

Summary of Progress:

A. Control of Pink Bollworm:

The objective of this experiment was to compare the effectiveness of three synthetic pyrethroid insecticides against the pink bollworm. Results of population reduction of the pink bollworm larvae in the bolls showed that FMC 33297 at two rates, 0.1 and 0.05 lbs. AI/acre, and Shell SD 43775 at 0.1 lbs. AI/acre, were equally effective against this insect. American Cyanamid AC 206,797 was not as effective in reducing larval populations.

Yield data, as shown in Table 1, indicates that all insecticide treatments produced significantly more seed cotton than did the untreated check. Shell SD 43775 produced more cotton than did American Cyanamid AC 206,797 and the higher rate of FMC 33297. It should be noted that the low rate of FMC 33297 produced more, but not significantly more, seed cotton than did the higher rate.

Table 1. Effects of Three Synthetic Pyrethroids on Cotton Yields when Applied for Control of Pink Bollworm. Yuma, AZ 1975.

Treatments	Rate #/A.	Yield in lbs. seed cotton per acre[1]	Statistical significance[2]
Check	-	2,369	a
AC 206,797	0.1	3,273	b
FMC 33297	0.1	3,679	bc
FMC 33297	0.05	3,988	cd
SD 43775	0.1	4,106	d

1. Harvested on October 30, 1975
2. Mean yields followed by the same letter are not significant at the 0.05 level. No significant differences occurred between replications.

B. Control of Cotton Leaf Perforator:

Two experimental insecticides were compared at the Cotton Research Center for their effectiveness against the cotton leaf perforator. A juvenile hormone, HLR RO-10-3108, and Mobil 10,000 were compared with a standard perforator control, Fundal, to compare effects on population reduction and on yield differences. In an attempt to separate cotton leaf perforator yield loss from pink bollworm yield loss, Sevin was also used as a treatment.

Mobil 10,000 did not effectively reduce larval populations when compared to the Fundal treatment. HLR RO-10-3108 did not reduce larval populations to as low a level as did the standard, but appeared to be reasonably effective.

An estimated percent of total leaf area damaged by cotton leaf perforator feeding was determined in September. These estimates indicated that 95 percent of the leaf area of the untreated check was damaged compared to 17 percent leaf damage in the Fundal treatment. The percent of leaf damage to RO-10-3108 was 28 percent and 74 percent with Mobil 10,000. The percent leaf area damaged corresponded favorably with respective population levels in these treatments.

Yield information is shown in Table 2 and shows a confusing picture in regard to cotton produced. The production of seed cotton was far below normal in this field and was accented by considerable variation in yield throughout the field. This condition may partially explain the erratic yield data.

Sevin, inserted in the test only for pink bollworm control, produced the most cotton. Fundal, used as the standard insecticide, yielded slightly more than the untreated check and less, but not significantly less, than both HLR RO-10-3108 and Mobil 10,000.

Pink bollworm damage was not a factor in yield loss. The highest percent of boll infestation was only 3.25 percent, far below the economic level of 15 percent.

Table 2. Effects of Experimental Insecticides on the Control of Cotton Leaf Perforators and on Cotton Yields. Cotton Research Center, Phoenix, AZ 1975.

Treatments	Rate-lbs./A.	Seasonal means-no. of larvae per leaf	Mean yield lbs. seed cotton/A.
Sevin	2.0	0.84	2061 a
Sevin-Fundal	2.0 - 0.5	0.36	1970 ab
HLR RO-10-3108	0.5	0.62	1813 ab
Mobil 10,000	1.0	1.57	1741 abc
Fundal	0.5	0.33	1650 bc
Untreated Check	-	3.97	1404 c

In another experiment at the Cotton Research Center, an attempt was made to determine the amount of yield loss caused by feeding of the cotton leaf perforator in relation to population levels. An untreated check was compared with three treatments where the initial insecticide application was started at different times. One treatment was started at the economic level of infestation of cotton leaf perforator larvae, another was started one week later, and still another, two weeks later. When treatments were initiated, applications were continued on a weekly schedule.

Table 3 shows the corresponding yields for all treatments. The treatment initiated at the economic level produced significantly more cotton than did the treatment initiated two weeks later and the untreated check. Results of this test show that feeding damage can cause yield loss but also that timing of insecticides for control of cotton leaf perforator is important.

Table 3. Yield Loss by Feeding of Cotton Leaf Perforators. Cotton Research Center, Phoenix, AZ 1975.

Treatments[1]	Seasonal means larvae/leaf	Mean yield - lbs. of seed cotton/acre
B - economic level	0.31	2213 a[2]
C - one week after B	0.42	1806 ab
D - two weeks after B	0.82	1683 b
A - untreated check	1.20	1605 b

1. Treatments: A. Untreated check
   B. Treatment initiated at economic infestation level
   C. Treatment initiated one week after Treatment B
   D. Treatment initiated two weeks after Treatment B

2. Mean yields followed by the same letter are not significantly different at the .05 percent level.

C. Control of Lygus Bugs:

The purpose of this experiment was to determine the effects of Temik on the control of lygus bugs and cotton yields. Temik was applied at 2.0 lbs. AI/acre as a side-dress application to squaring cotton. Two treatments were utilized, an untreated check and a treatment where Temik was applied.

No population differences occurred in the adult numbers between the two treatments. However, consistent nymphal differences did occur throughout the sampling period. On an average, the untreated check had five nymphs per 50 sweeps more than did the Temik treatment. This nymphal difference was reflected in the yields as the Temik treatment produced more seed cotton per acre than did the untreated check. This data is expressed in Table 4.

Table 4. Evaluation of Temik for the Control of Lygus Bugs and its Effects on Yield. W. Wuertz Farm, LaPalma, AZ 1975.

Treatments	Mean no. lygus bugs per 50 sweeps		Mean yields lbs. seed cotton/acre	Statistical Significance
	Adults	Nymphs		
Untreated check	8.8	5.7	1979	a
Temik treated at 2.0 lbs. AI/A	6.3	1.0	2816	b

PINK BOLLWORM PHEROMONE AND PREDICTION RESEARCH

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Objectives: 1. To develop and evaluate early season mass trapping programs for male moths to reduce and/or delay subsequent boll infestations in Arizona cotton.
2. To determine the feasibility of using pheromone trap catches as a method of scheduling insecticide application for pink bollworm control in cotton.